

TITLE: Do You Like Maps?

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A collection of articles on the historical, operational, doctrinal, and theoretical aspects of intelligence.

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*Applications in intelligence***DO YOU LIKE MAPS?**

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*So geographers, in Afric maps,
With savage pictures fill their gaps.
And o'er uninhabited downs
Place elephants for want of towns.*

Jonathan Swift

It was a hot, muggy June day in 1951 when I was admitted to Temporary Building 11, located near the intersection of Twenty-third Street and Constitution Avenue in Washington. Although I was there for an interview with an official of the Central Intelligence Agency, I knew little about the CIA at that time beyond its insistence that I complete a tiresomely long application form. But hints of CIA and its activities gleaned from newspapers and magazines had piqued my curiosity. And when the secretary announced that a Mr. (b)(3)(c) (b)(3)(c) would see me, I hoped to learn—or at least receive an inkling—about job opportunities that might lead to an exciting, perhaps exotic career.

(b)(3)(c) then Chief of the Geography Division, Office of Research and Reports, was a man of few words. He asked: "Do you like maps?"

The question of my affection for maps, or lack thereof, had seldom crossed my mind. As a graduate student in geography, I had used maps as a source of information and as a way to present and record data. And as a former navigator in the United States Army Air Corps, the importance of accurate maps and charts—and my dependence on them for survival—had been amply demonstrated. My first reaction to (b)(3)(c) question was to recall maps I did not favor, such as those based on the mercator projection that portrayed the Soviet Union occupying most of the northern hemisphere and of the erroneous impression this created in the minds of cartographic innocents. A particular pilotage chart once used in navigation school also came to mind; I had grievously misread the chart, leading me to direct the pilot of our twin-engine Beechcraft toward Mexico rather than to San Marcos, Texas. Despite these quirky thoughts I managed, after a brief pause, to respond that I did indeed "like maps."

"Good," replied (b)(3)(c) "I think you'll enjoy working with us." With that he stood up, indicating the end of our brief conversation. Before the summer was over, and after suffering through the indignities administered in Building 13, then housing the Polygraph Division of the Office of Security, I entered on duty with the Geography Division in the profession of intelligence.

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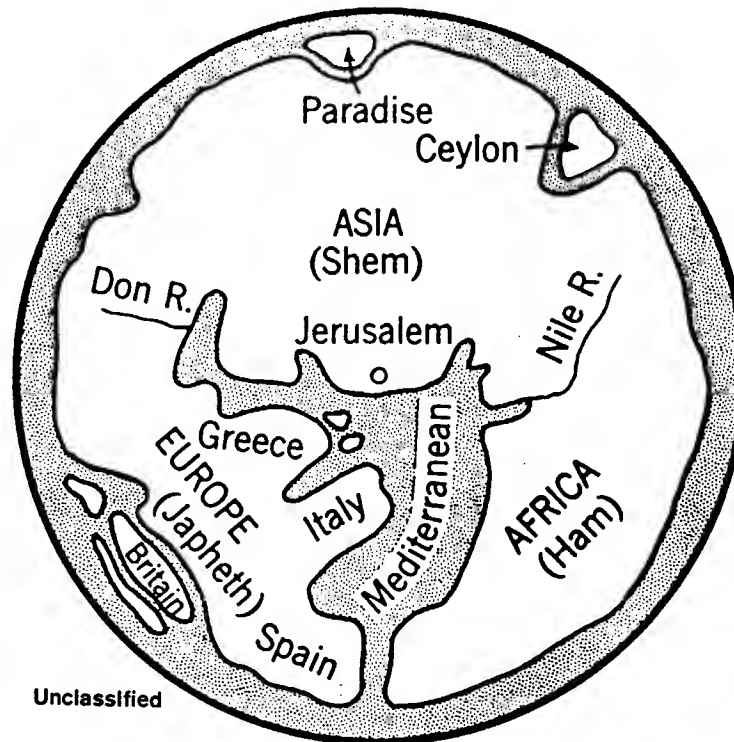
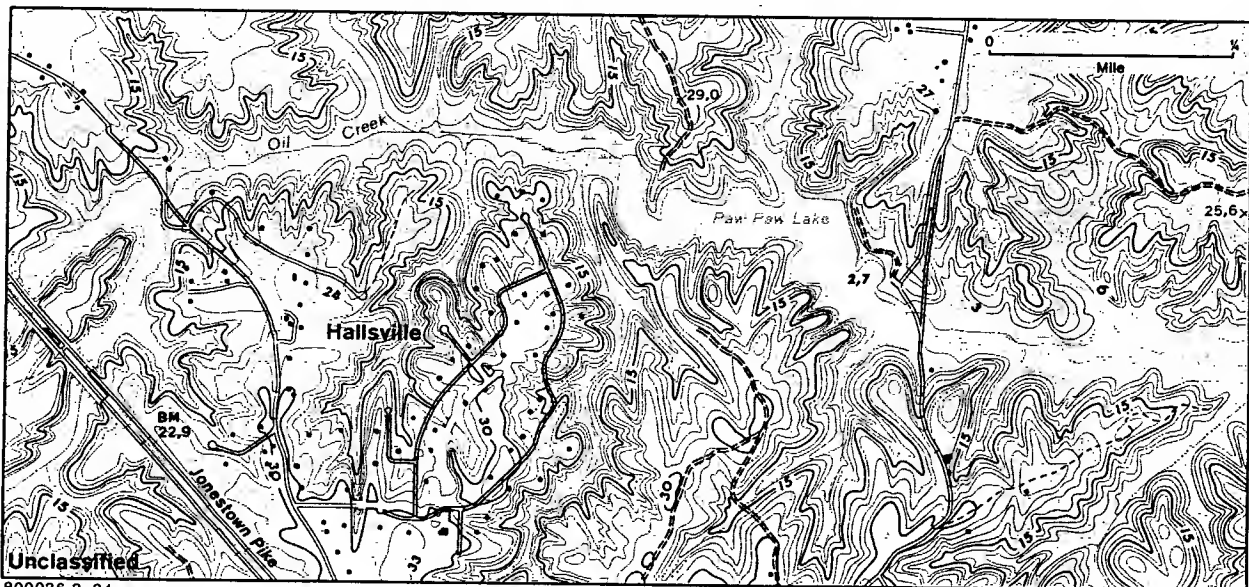


Figure 1. Progress in Mapping. The "T in O"¹ map of the world, strongly influenced by religious history and thinking, was in common use in Europe until the thirteenth century. Greek maps made more than a thousand years earlier were much more accurate representations of the world known to the Greeks. These maps were forgotten, later "rediscovered", and in use at the time of Columbus. The lower map is a section from a modern topographic map at 1:25,000 scale, providing good terrain definition (contours at 3 meter intervals), transportation routes from trails to paved roads, areas covered by vegetation, and individual buildings.

¹ Mediterranean Sea, Don and Nile Rivers form a "T" inside a circular Ocean.

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Knowledge about Place

Maps are ways to represent knowledge about place; the map is a means, a device, to help understand the complexities of the earth. As a representation of the earth's reality, maps depict the spatial relationships existing among physical, cultural, political, and other natural and man-made features that have attributes of space and place.

Maps originated as a means of improving communication. Some of the earliest known maps delineated property limits and land ownership in densely settled areas. (The tax assessor, no doubt, soon followed.) The maps of the ancients were centered on the country or area where the map was made. Areas unknown were left blank or decorated with cartographic or mythological graffiti. Measurement was essential for accuracy, as was the realization of the difficulty of depicting the round earth on flat paper, for which projections were devised to lessen the distortions inherent to map making. Knowledge of the earth was gained, and sometimes lost. Columbus sailed West to reach India, believing the earth was about two-thirds smaller than its actual size, even though Eratosthenes by 200 B.C. had made a reasonably accurate estimate of the earth's dimensions.

The intensified European exploration of the earth from the Sixteenth Century onward and the growth of trade and communication heightened the need for improved navigational materials and equipment and specifically for accurate sailing charts and maps. Charts showing coastal features and navigational hazards usually were regarded as state secrets. By the late Eighteenth Century many countries had established national survey and mapping organizations to survey their territories and compile detailed topographic maps. National leaders came to realize that it was difficult to govern—and to fight one another—without adequate maps. Geodetically accurate topographic maps were also necessary to the building of a modern, technically advanced society.

Many people, including intelligence officers, are unaware of the variety in uses of maps. Others give lip service to the utility of maps, but fail to understand the significance of scale, projection, and purpose. Historians and others, for example, often place small and frequently unreadable maps at the beginning of their books and articles, an apparent propitiatory act that in most cases tells more about the author and publisher than the map conveys to the reader. Still others feel vaguely reassured if a map or two is nearby, perhaps hanging on a wall, to ensure that the participants in a conference do not mistake Africa for South America.

While many think of maps as primarily useful to show simple relationships and prosaic physical and cultural details, the data and types of relationships mappable are infinite. For example:

- *The National Atlas of Japan* contains maps of the "Mean Date of the First Coloring of the Red Maple," the "First Warble of the Bush Warbler," and, by administrative unit, the number of tatami (reed mats) per household.¹

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- Maps were used to illustrate key findings in what is rumored to have been the most widely read article in the staid *Annals of the Association of American Geographers*, a presumably well-researched work that described the characteristics, clientele, dynamics, and distribution of brothels in Nevada.²
- A series of maps in the *Geographic Review* illustrated the geographic implications of football in the United States, depicting such factors as areas of higher than average per-capita production of players and the interregional migration of high school players to colleges and universities.³
- A recent atlas contains a map with the provocative title "Urban Heavings in the Seventies" that depicts the worldwide locations of urban strikes and riots during that fractious decade.⁴

Maps and Intelligence

In intelligence, the use of maps and other graphics has increased over the years along with a greater sophistication in the use and understanding of the effect of color, symbols, and design to convey meaning. Some of the ways to use maps:

- As intelligence sources containing valuable locational and distributional data—sometimes unique and highly classified, such as of missile sites, and sometimes unclassified but representative of official policy, such as territorial claims.
- As analytic tools serving as graphic representations of a discrete portion of the earth, useful to assess the spatial or locational factors of the data arrayed (and sometimes added) and their significance.
- As a means to present research results, particularly to highlight key findings.
- As a means to record and report data, particularly in fast-moving situations.

Maps are crises crutches. Surprise events—the building of the Berlin Wall, seizure of the *Mayaguez*, invasion of the Falklands—bring instant demands from intelligence producers and consumers for map coverage. In crises, maps are used to track rapidly changing developments, to help identify a glut of often unfamiliar place-names, to provide background details from which briefing boards can be constructed, and to analyze military and clandestine situations, particularly where operations are taking place or are planned.

The relationship of maps and intelligence extends to the acquisition of information used in the compilation of maps. The history of such intelligence operations goes back to Biblical times when Moses instructed his spies "to see the land, what it is; and the people whether they be strong or weak . . . what cities they be that they dwell in."

Modern wars have spurred topographic mapping. The advent of aerial photography and the recent development of more sophisticated imagery

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systems have made possible the rapid acquisition of vast amounts of information, thereby greatly speeding new mapping programs as well as the updating of older maps. The availability of imagery has also spawned the making of large-scale photomaps on which points of interest are highlighted, e.g., photomaps of Beirut and environs. Maps and their imagery-derived mutants have significant intelligence value and play an important role in communicating facts, relationships, and findings to assist decision makers in choosing courses of action.

The use of maps to serve intelligence needs and to help resolve problems is illustrated by several examples.

The Great Game In Asia: Knowledge is Power

A biting wind swept through the Himalayan pass, whipping the Buddhist prayer flags that marked it. A lone traveler, head bowed, slowly descended into the forbidden land of Tibet. The year was 1865; the traveler was Nain Singh, an Indian born in the high Himalayas who spoke one of the Tibetan dialects; and the purpose of his journey was shrouded in secrecy.

A few days later Nain Singh joined a caravan of traders from western Tibet bound for Lhasa. He arrived in Lhasa in January 1866 and remained there until the traders began their return journey some three months later. Slipping away from the caravan one night, Nain Singh hurried south to his destination—the Indian hill station of Dehra Dun—where he was received by Survey of India (SOI) officials anxiously awaiting his return.

Nain Singh was no ordinary traveler. He had been carefully selected and trained over a period of years by SOI officials in reconnaissance survey techniques. During his time in Tibet, Nain Singh had surreptitiously paced his route, observed latitudes with a sextant, measured elevations by boiling water, and kept precise notes of his observations.

The results of Nain Singh's efforts were impressive. At last SOI officials could start filling in the large blank places on their maps of Tibet with reasonably accurate information. Not only were SOI officials gratified over obtaining geographic details about Tibet, but the program spelled progress to officials in Great Britain intent on obtaining reliable maps of Tibet. For London, this mapping caper represented another card in the "great game in Asia" that preoccupied British and Russian governments during the latter half of the Nineteenth Century as they vied for influence in Central Asia.

From 1864 to 1885, the SOI trained dozens more for missions similar to Nain Singh's. Collectively known as the "pundits," they took different guises, some as traders, others as pilgrims or holy men, exploring different areas and following different routes. Those who traveled as pilgrims, for example, carried genuine rosaries, except that their rosaries contained only 100 of the regulation 108 beads and each tenth bead was slightly larger to aid in counting paces. The cylindrical Buddhist prayer wheel hid compartments for storing notes, and clothing and baggage concealed pockets where equipment could be carried. The accuracy of the pundits' reconnaissance surveys proved remarkable when many years later the British were able to map parts of Tibet.⁵

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Almost a century later a minor replay of the "great game" took place. Tibetan refugees who joined the resistance movement (1959-66) to oppose the Chinese occupation of Tibet were instructed in the art of field sketching and mapping as part of their overall training in intelligence reporting prior to reentering Tibet. At that time maps of Tibet still were based in part on the work of the pundits, and were not superseded until imagery-based maps were produced in the late 1960s.

"Make Me a Map of the Valley"

On 26 March 1862 Jedediah Hotchkiss, a topographic engineer, was summoned to the tent of General T. J. (Stonewall) Jackson. "I want you," said Jackson, "to make me a map of the Valley, from Harpers Ferry to Lexington, showing all the points of offense and defense in those places."⁶

Jedediah Hotchkiss drafted his maps of the Valley of Virginia under trying circumstances. He was superb in the skills of field reconnaissance. On his horse, laboriously bending over his sketchbook and drawing "curious lines" on a scrap of paper, Hotchkiss was a familiar sight to Confederate soldiers. From notes and observations, Hotchkiss would rapidly draw his maps, particularly important for Jackson, who had little facility in visually grasping the lay of the land. Hotchkiss supplemented his maps with quick field sketches, using colored pencils for greater clarity in defining nearby surface features and in showing troop locations. Hotchkiss' maps and sketches, according to Civil War historian Douglas Southwell Freeman, "were to contribute to the speed and boldness of all Jackson's future operations in the Valley."⁷ Throughout all but the final year of the Civil War, Union generals were repeatedly bamboozled by Confederate armies that moved swiftly—and usually undetected—via the Valley of Virginia to threaten the North and Washington itself.

Moscow and its Maps

Acquisition of topographic maps produced by the Soviet Union has been a high priority US intelligence objective dating from early in World War II. Topographic maps, which are highly detailed, geodetically accurate maps containing contour lines (lines that connect points of equal elevation), are essential to military planning and operations and for precise target locations.

During the 1950s many operational studies based largely on available topographic maps were prepared for use in exfiltration and infiltration operations in denied areas, principally Eastern Europe and the USSR. Some coverage of the western USSR had been acquired by Germany during the Second World War and hence by the US. But many areas, particularly newer urban and industrial areas east of the Urals, were without reliable map coverage. As the change from manned bombers to missiles took place, the need grew for geodetically accurate topographic maps. Moscow, of course, recognized their value and placed strict security controls on their use and dissemination; despite considerable efforts and a high priority, various collection efforts have been largely unsuccessful in ferreting topographic maps out of the USSR.

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The advent of satellite imagery in 1960 and the immense areas that could be covered led to a joint CIA/Department of Defense program using the new imagery as a base for compiling maps at the scale of 1:250,000. CIA analysts added intelligence annotations to the maps. In 1965 the program was expanded to include China, extensive areas of which were also poorly mapped. Later, satellite imagery specifically designed for mapping use permitted the compilation of topographic maps with fairly good geodetic control.

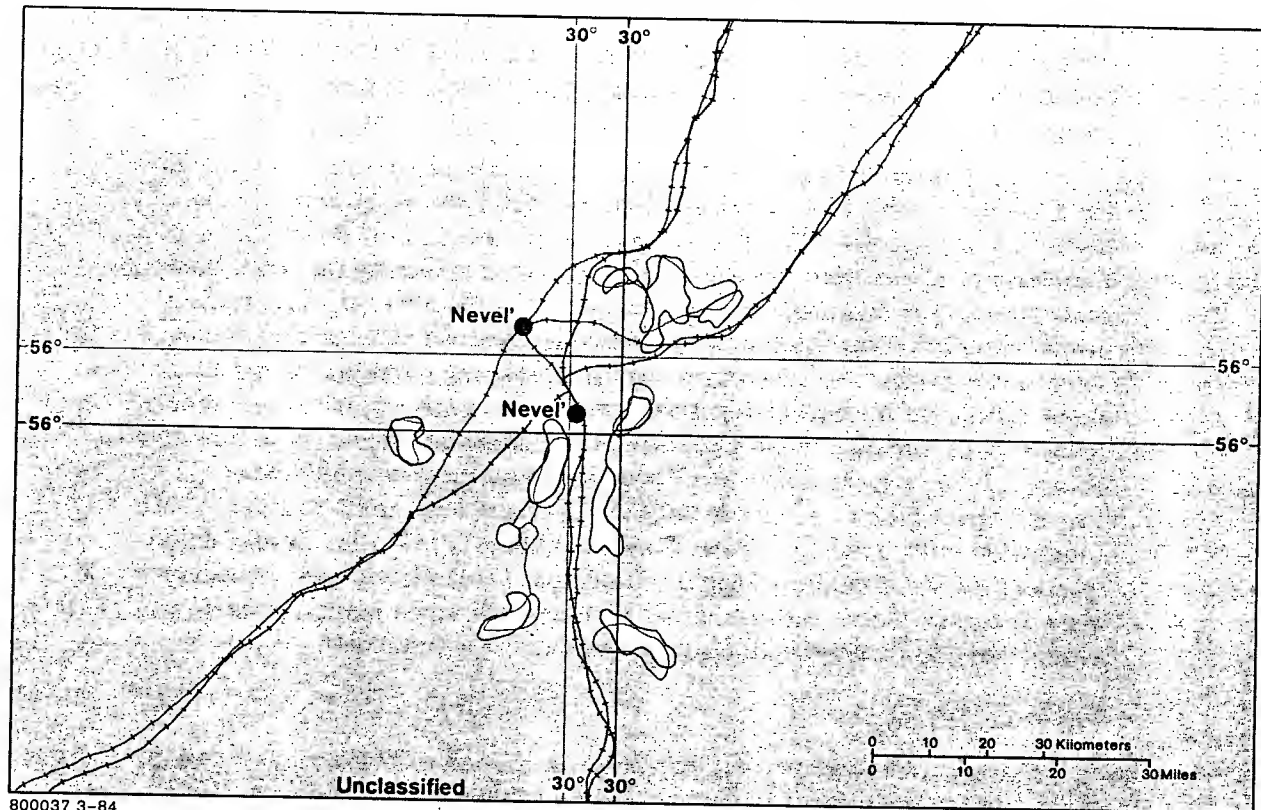


Figure 2. Nevel' Area. The extent of locational distortion in the 1967 Soviet World Atlas is demonstrated by contrasting its map of the Nevel' area (in red) with the corresponding map contained in the 1954 edition of the Atlas (in this instance using the lakes as a control). Note the resulting shifts in the geographic grid and the town of Nevel'. The railroad lines have been twisted out of their true alignment, with one line cutting across a lake which has been conveniently distorted in the 1967 edition.

Moscow's preoccupation with security led to a bizarre decision in the early 1960s that went far beyond the restriction on the release of Soviet maps for public sale. Maps, including those in the prestigious *Atlas Mira* (world atlas), were degraded by a systematic distortion program that depicted cities and towns several kilometers or more from their true location. To do this also meant that Soviet cartographers had to relocate and realign all base map hydrography and transportation detail to make everything "fit."

Soviet officials, fearful of improved US intelligence collection systems, were seeking ways to frustrate US efforts to develop conventional and radar-matching maps for bombing Soviet targets. The great effort and time spent in devising such obvious cartographic distortions seems irrational, given the technology available to the US mapping establishment and about which the

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Soviets presumably had some knowledge. There is some evidence that Soviet scientists were privately chagrined by the clumsy and foolish attempts at deception.

An Unseemly Scramble

Japan's attack on Pearl Harbor in December 1941 not only demonstrated the lack of preparedness by US defense forces but also brought to light the general untidy state of US readiness for global conflict. This lack of readiness extended to the availability of maps. The US did not have the maps and atlases essential for intelligence research and planning military operations against its enemies.

A small beginning had been made in the autumn of 1941 to create within the Coordinator of Information—to become the Office of Strategic Services (OSS) in July 1942—a section to provide a centralized point for map information. The mission was eventually broadened to include the acquisition, evaluation, and distribution of maps. But the coming of war initially overwhelmed the small unit and in the hectic months following Pearl Harbor there was a frantic and often unseemly scramble for maps and information about previously obscure places. In the search for maps, various government agencies sent out individuals on procurement missions, mostly to university libraries and to private collections. These missions were often duplicative. The paucity of maps for certain areas, such as the Pacific and Asia, led to a nationwide radio appeal by Major General William J. Donovan, head of OSS, in mid-1942. In time, coordinated efforts and a systematic foreign procurement program, along with airborne photo-reconnaissance mapping missions, augmented and updated map resources needed for wartime use.

The SA-5 Debate

A major intelligence controversy arose in the mid-1960s over the mission of a defensive missile system then being deployed in the Soviet Union. Intelligence derived from study of the configuration of the system and its components had been used by analysts to support two different viewpoints. Some analysts said it was an antiballistic missile defensive system; others held that it was a surface-to-air missile system directed at aircraft, specifically low-flying aircraft.

The Defensive Missiles Systems Division, Office of Scientific Intelligence, decided to approach the problem from yet another viewpoint and asked that the Geography Division, Office of Basic and Geographic Intelligence, undertake studies of the physical characteristics at and near several of the deployment sites. The purpose of the study was to determine the effects of terrain masking on the capabilities of the target acquisition radars. The studies prepared were done through detailed map analysis, supplemented by imagery; a formula was devised to calculate the effect of the earth's curvature to determine the maximum distance of radar intercept of targets at specified altitudes.

From an examination of several SA-5 sites, a wrapup study concluded that "location of the Moscow area SA-5 sites on relatively high ground well

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forward of obstructive terrain features indicates a potential to intercept low-level targets at distances limited only by the earth's curvature." Thus, this analysis helped pin down the primary mission of the SA-5, information which was vital in the context of the complex debate and negotiations that led to the signing of the ABM Treaty between the US and USSR in 1972.

Every Road, Every House, Every Tree

In her autobiography, *My Life*, Golda Meir recalled the prolonged negotiations in 1974 over the disengagement of Israeli and Syrian forces on the Golan Heights and the role played by then Secretary of State Henry Kissinger. She stated that "there wasn't a road, a house, or even a tree there about which he didn't know everything there was to know."⁸ In her tribute to Kissinger and his "shuttle diplomacy," Golda Meir was reflecting on the critical importance of maps in the negotiations.

In Middle East negotiations, the United States has provided maps for the negotiations, so that there will be a common data base for each side. Almost every locality, mountain, ruin, and other landscape feature possesses some historic, symbolic, or religious significance that complicates negotiations on territorial readjustments.

Maps used in negotiations have included large- or medium-scale topographic maps or maps compiled from several topographic map sheets. Maps prepared especially for use by US negotiators have shown population distribution, the location of settlements, water supply data, ethnic composition of various areas, and military installations—topics important to an understanding of the range of problems and issues involved in territorial negotiations and exchanges. In most cases the larger scale maps used by the negotiating teams to reach agreement on disengagement, resettlement, and territorial exchanges have been updated by imagery and intelligence reports. Frequently, photography was annotated to identify specific points, show various installations, and highlight areas discussed by the negotiators.

In the 1974 Syrian-Israeli negotiations, maps were prepared to show whether the pre-1967 Syrian settlements in the Golan Heights still existed or had been razed, and to identify the location of new Israeli settlements. The up-to-date intelligence [redacted] to the basic topographic map was essential, since Syrian negotiators were often ignorant of the status of individual settlements in the Israeli-occupied areas. Annotated photomaps, town plans, and similar types of briefing materials were instrumental to the success of these talks. Henry Kissinger noted in his memoir, *Years of Upheaval*, one of the many proposals put forward to President Assad called for a "... line ... drawn 200 meters west of Quneitra measured from the line of buildings on the west side of the western road." This was indicative of the extreme detail required.⁹ (b)(1)
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After the October 1973 War, in the negotiations that led eventually to the March 1979 Egyptian-Israeli Peace Treaty, geographic tools and analysis proved valuable in selecting and verifying roughly three parallel north-south roads so that the Egyptian, Israeli, and UN forces could be equally serviced, in

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determining the placement of lines through the Sinai passes, and in recommending the best locations for US monitoring sites, [redacted] and the Egyptian and Israeli surveillance stations. Although delineation of the lines in the Sinai passes, Mitla and Giddi, was done in Washington, Israeli representatives were not satisfied with the alignment until a senior Agency geographer personally examined the area. According to Edward R. F. Sheehan's book, *The Arabs, Israelis, and Kissinger*, the CIA official [redacted] (b)(3)(c) [redacted] now retired) strolled through the Giddi pass with Israeli General Mordechai Gur and stated, "General, you're still inside the pass." ¹⁰ (Meaning that the original Washington view, rather than the Israeli, prevailed.)

Maps provided for the Camp David negotiations included several annexes, prepared by a technical working group made up of Israeli, Egyptian, and US personnel. The base map, compiled from existing US topographic maps, was initially updated with road and other transport details by US representatives. In preparing the maps for use in the treaty, Israeli and Egyptian representatives carefully purged the map of hundreds of "offending" names and references, particularly those reflecting Israeli occupation of the Sinai. The representatives let stand the names of physical features, regardless of their cultural origin.

Maps, Map Users, and Truth

The examples cited indicate the value of maps in intelligence analysis, operational planning, the presentation of intelligence findings, and in reporting. There are many opportunities for greater uses of maps in both analysis and in the communication of intelligence results.

Unfortunately, many analysts seldom think of maps as useful in their research. Moreover, availability of imagery may cause analysts to forget the use of maps as a research tool. They are overlooking something that is valuable, often essential. Some examples:

- Resource estimative analyses. Predictions of oilfield production potentials rely in part on data supplied by structural or schematic geologic maps, geographic profiles, and other maps based on geophysical exploration and drilling records.
- Analysis of territorial disputes and boundary disagreements, including jurisdiction over maritime areas. Maps are frequently cited in polemics, but authoritative maps are mostly limited to those that are part of the documentation resulting from treaty implementation, e.g., demarcation maps prepared by official boundary survey teams and signed by officials from each country. In some cases official maps may not be available, requiring the plotting of the coordinate locations of boundary points on a suitable base.

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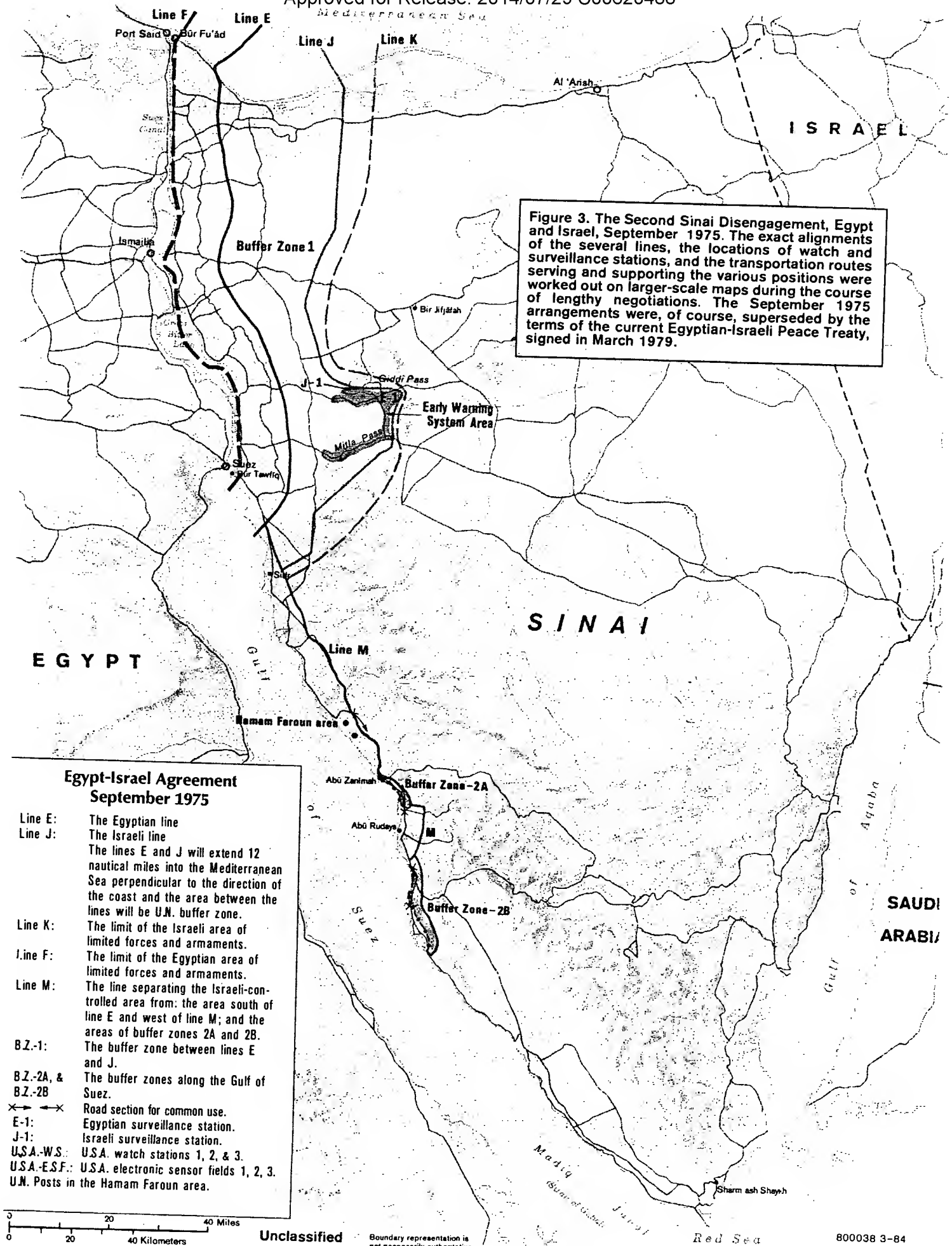


Figure 3. The Second Sinai Disengagement, Egypt and Israel, September 1975. The exact alignments of the several lines, the locations of watch and surveillance stations, and the transportation routes serving and supporting the various positions were worked out on larger-scale maps during the course of lengthy negotiations. The September 1975 arrangements were, of course, superseded by the terms of the current Egyptian-Israeli Peace Treaty, signed in March 1979.

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- Political and economic studies that have a significant spatial character. Analysts can use maps to sort out complex aspects and relationships for making intelligence judgments. Examples: problems associated with refugee groups located in sensitive frontier areas where complex ethnic rivalries exist, the availability of access routes to the refugees, the dispensing of aid to the refugees, the feasibility of military action against the refugees from nearby countries, and similar problems in which locational factors are important.
- Locational factors in military and strategic analysis. Maps are highly important tools in the analysis of most military situations and in the construction of scenarios anticipating military actions and responses. For example, possession by Iraq of aircraft equipped with the Exocet air-to-ground missile required map analysis of probable target areas in the Persian Gulf area based on airfield locations, aircraft range, and range of the missile.

Maps as Shorthand

Complex topics and data often can be explained succinctly through use of a skillfully compiled map. How better to understand the complex linguistic and dialect patterns existing in much of Europe than by maps? International trade in petroleum and petroleum products is easier to comprehend if data are transformed by graphic techniques and displayed on a map base. A map is essential to understand complex maritime claims. The most successful unclassified Agency products, measured by the number of copies distributed and favorable comments received, were the atlases published by the Office of Basic and Geographic Intelligence (later the Office of Geographic and Cartographic Research) during the 1970s. These atlases focused on areas (China, polar regions, Indian Ocean) and topics (USSR agriculture) by blending carefully designed maps and graphics with text on the major characteristics, problems, and potentials of the subjects. The Agency's most lavish use of maps, photos, and other graphic materials has been in highly classified and limited readership products that describe and evaluate the Soviet strategic forces.

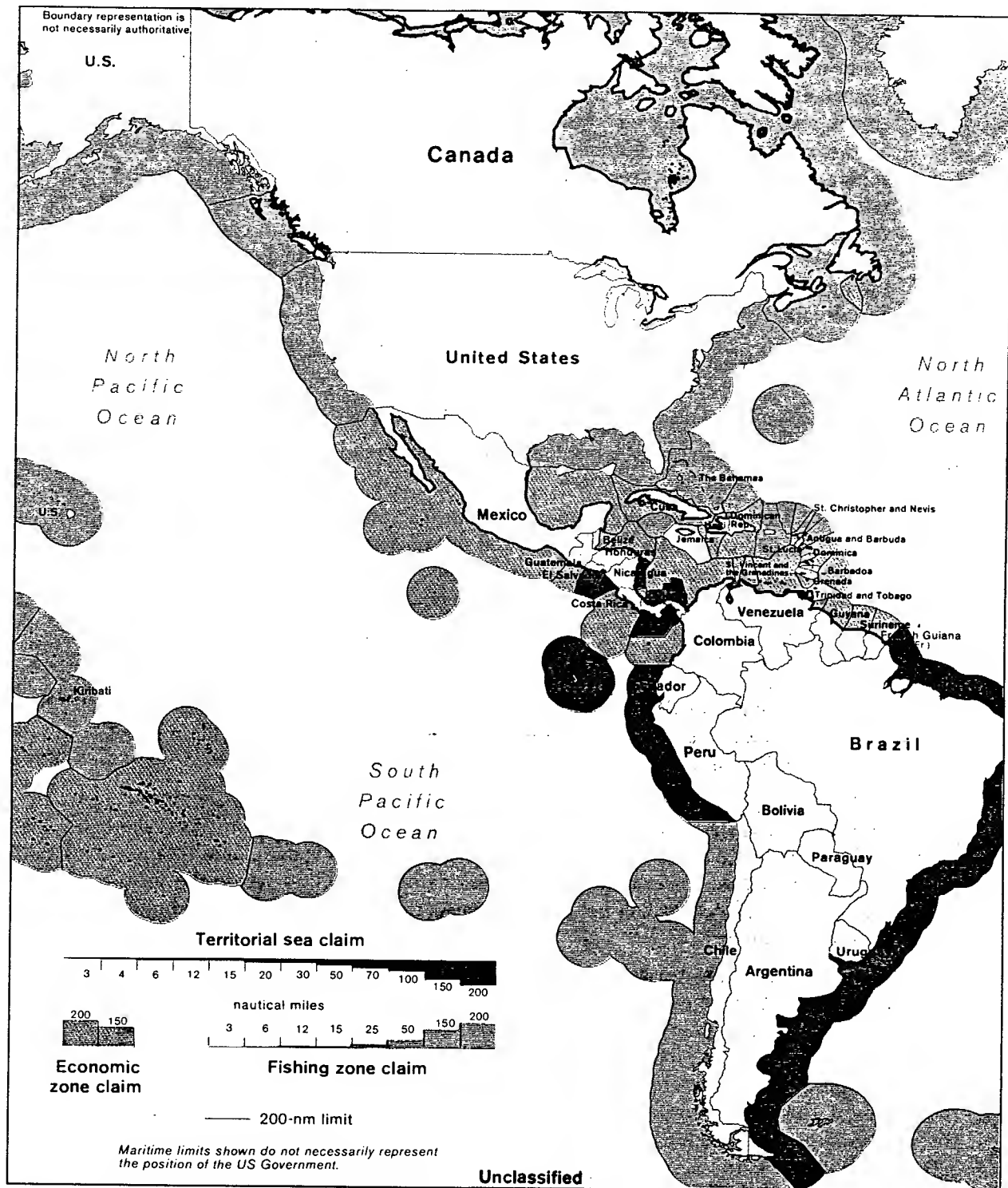
Maps often add dazzle to dull data. A decade ago, a 729-page report was published, consisting mainly of voluminous tables of the type that warm the hearts of statisticians and glaze the eyes of others. The tables represented the results of a massive research project undertaken by the National Cancer Institute that tabulated deaths from cancer for every county in the United States for the period 1950-69. The report gathered dust until the information was repackaged and later printed as a 103-page *Atlas of Cancer Mortality in U.S. Counties*. A national map used different tints to show the incidence of cancer deaths by county. A great red blotch covered the industrial northeast with the center of this oncological disaster area roughly coinciding with the state of New Jersey. The atlas became news. Headlines talked about "cancer alley," and photographers and television crews stalked the northern end of the New Jersey Turnpike to film the miles of smokestacks, refineries, and other manifestations of industrial America.¹¹ Nothing had changed since the original report—except the manner of presentation.

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Figure 4. Mapping Maritime Claims. The increasing economic importance of national maritime areas has given rise to UN-sponsored international conferences on Law of the Sea issues to attempt to reach agreement over the definitions of the various types of maritime claims. National claims to maritime jurisdictions and their cartographic representation are the responsibility of the Office of The Geographer, Department of State.

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An example of a map that is both an excellent intelligence source and a striking presentation of research findings is a map of Lebanon in a recently published German atlas showing the distribution of religious adherents—Christians, Muslims, Druze, and Jews.¹² All populated places are shown by circles proportional to their size; a scale in the legend is used to determine approximate population numbers. The circles are color coded as to the percentage of the religious group found in each locality; numbers in each circle refer to an accompanying list of place names for the hundreds of smaller settlements not identified on the map. The map allows users to comprehend the major areas of religious concentrations and to compute, by use of the scale, the approximate numbers of religious adherents in the individual settlements and in larger areas.

With all their advantages, maps also have limitations—sometimes apparent but often unrecognized:

- Maps symbolize reality; they also distort it.
- Maps communicate, but the message received depends on the presentation and the map user.
- Maps do not usually receive the critical scrutiny that the written word is given. John K. Wright dissected this uncritical view of maps and the lack of logic behind it in his paper, "Map Makers are Human." Wright warned that "the trim, precise, and clean-cut appearance that a well-drawn map presents lends it an air of scientific authenticity that . . . may not be deserved."¹³ In 1946 the chief of the cartographic unit, then in the Department of State and later transferred to CIA (the organizational progenitor of the present Cartography and Design Group) noted that "it is a well known fact that the branch seldom produces a map without noticeable errors."

Map projections are important. The difficulty of depicting the round earth on flat paper introduces distortion and sometimes confusion when the map covers large areas of the earth. A common problem is with long-distance air or sea routes—for example, from Washington to Tokyo—where the most direct route via Alaska will not be clear unless the proper projection and map orientation is used.

Map scale dictates detail. A page-size map of France limits the amount of detail and to some extent purpose of the map. A wall map of France, on the other hand, at a much larger scale can display a much more detailed slice of "reality," though predilections of the particular mapmaker in translating purpose into cartographic product will make each map distinctive. Highway maps of a state or group of states, though made for the same purpose but by different cartographic units, will vary significantly in the amount of detail provided and in the readability and ease of use. The degree of detail relative to scale that the cartographer may think appropriate may not be that wanted by the requester—particularly if the requester is a senior level official. The requester may want only one message on the map and order "clutter" removed.

Maps distort reality; it is sometimes unintended. The professional cartographer is sometimes loath to leave large blank areas on maps. In the desire to

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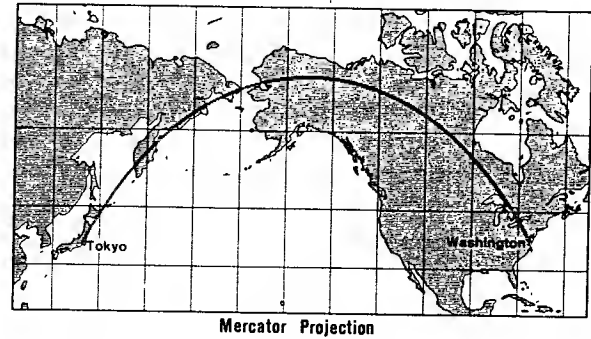
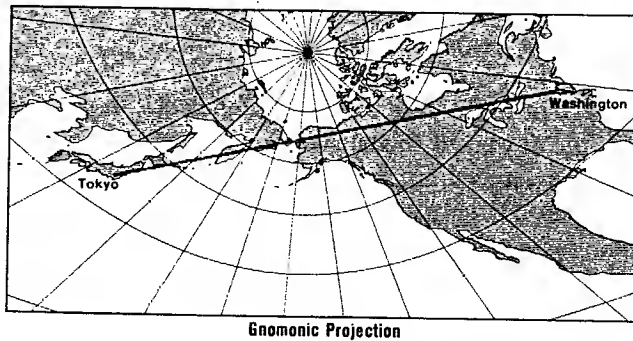
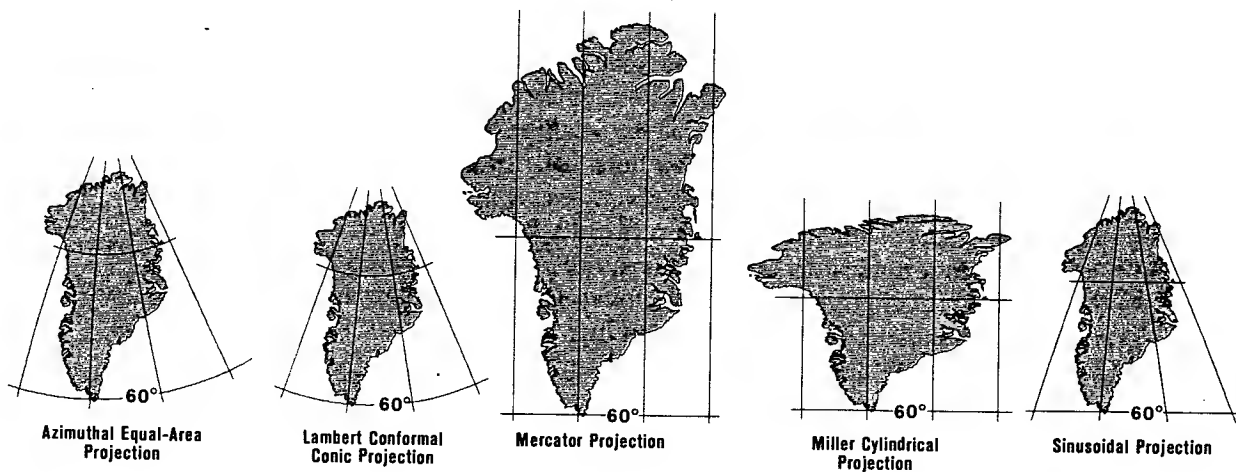
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Figure 5. The problem of transforming the spherical Earth onto a flat surface is illustrated by navigation lines (above) and different ways of representing an area of the Earth's surface (below). In the example below, Greenland is shown on five different projections, all with the same scale at 60° North.



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"complete" the map, the cartographer may fill in the blank areas with symbols that mislead the viewer. Erroneous conclusions about population density may be drawn from a superficial scanning, particularly if populated places are not symbolized by size. Examples abound of maps "pleasing" to the eye but in fact distorting meaning and purpose. Monmonier's comment in his essay, "Maps, Distortion, and Meaning," is appropriate: "Acclaim by other cartographers is no guarantee that a map is suited to its audience."¹⁴

Maps are out of date the day they are printed; and because they are mostly compiled from other maps the perpetuation of error is a constant problem. Intelligence maps that portray order-of-battle and other types of military data particularly susceptible to rapid change are kept up to date by the demands of current reporting. But some types of map detail that in themselves are seldom topics of intelligence interest may continue unchanged and outdated. Administrative maps, for example, may not reflect current status, particularly in countries where a change in government may cause experimentation in the number and designation of internal administrative units. Place names are often altered in the wake of political change or when a new system of romanization is adopted, such as China's 1979 shift from Wade-Giles to the pinyin system (Peking became Beijing). There is also the problem of official names policy and unofficial usage, and differences in reporting names in cables and press treatment. Consistency is not always possible nor even desirable. Medium- and large-scale maps often do not reflect such changes as new reservoirs, transportation additions and deletions, and similar detail because of the infrequency of their revision. Many of these changes are not made for some time because of practical difficulties in keeping the cartographic data bank current.

. . .

The objectives of those who make maps and those who use them in intelligence reports are to communicate intelligence findings, to assist readers in sorting out the spatial dimensions of the analysis, and to provide a convenient graphic reference for important locations and installations highlighted in the text. Although the objectives are to prevent ambiguity in meaning and message, map use is not effortless and users should be aware that maps alone are imperfect communicators. Map use requires participation on the part of the user, similar to that required to decipher statistical tables, and this effort is needed to complete the communication link.

As a measure of the growing awareness and acceptance of graphics in intelligence presentations, statistics of the Cartography and Design Group show that the annual number of maps produced has risen from about 6,000 in the mid-1960s to approximately 16,000 in the early 1980s. The increased output reflects not only an awareness of product value but also the advent of improved technology.

The wider use of maps does suggest that intelligence consumers increasingly "like maps." The question put to me in 1951 as I embarked on a career as an Agency geographer seems even more important now, and it applies to all in the profession and discipline of intelligence.

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